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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,495	02/13/2001	Lorraine M. Herger	YOR920000505US1(13841)	9923

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EXAMINER

BATAILLE, PIERRE MICHE

ART UNIT PAPER NUMBER

2186

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/782,495

Applicant(s)

HERGER ET AL.

Examiner

Pierre-Michel Bataille

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-4, 6-8, 15-19, 21-23 and 28-30 is/are rejected.
7) ☒ Claim(s) 5, 9-14, 20, 24-27, and 29-30 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is taken in response to application's communication filed June 29, 2004. Claims 1-30 are now pending in the application.

Response to Arguments

2. Applicant's arguments filed June 29, 2004 have been fully considered but they are not deemed to be persuasive for at least the remarks below.

The March 30, 2004 Office Action correctly indicated that Relph does not teach memory usage in a computer system that is transparent to the operating system kernel, however, provided the Moore's reference (US 6,564,305) as teaching memory compression in a computer device that is transparent to the operating system software.

Applicant argued that in Moore's system, the operating system is well aware of the compression and is involved. However, this concept is exactly what Moore solved in the invention. Moore states in the background of related art: **"The compression in prior devices is usually performed by the application programs that execute in the devices. Unfortunately, the implementation of compression at the application level usually greatly increases the cost of application development and may decrease stability of application execution."** (Col. 1, Lines 32-36)

Moore continues to add: **"A device is disclosed with compressing memory management for effectively increasing the size of its physical memory while insulating applications from the underlying memory compression."** ... **"The**

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device includes mechanisms for transferring the information between the compressed and uncompressed domains in a manner that is transparent to applications and other software elements executing in the device". (Col. 1, Lines 46-50)

While the application suggests when reading the above passage that "the control program and O/S in Moore is modified to become aware that there is compressed memory", Moore clearly discloses *"transferring information between compressed and uncompressed domains in a manner that is transparent to applications and other software elements executing in the device"*.

The applicant argued that Moore, at Col. 3, Lines 36-52, specifically talks about memory control being wholly within the domain of the operating system. To the contrary, it is respectfully stated that such assertion is wrong as the section cited features nothing of the sort. However, Moore reemphasizes at lines 53-60 of the same cited column:

"These mechanisms for transferring information between the compressed and uncompressed domains function in a manner that is transparent to software elements such as application programs that are implemented in the device 10. Application programs, for example, execute without regard to the underlying address translations performed by the page manager and the compression performed on the hardware path between the compressed and uncompressed domains."

In view of the above remarks, the rejection pertaining to claims 1-4, 6-8, 15-19, 21-23, and 28, is maintained and repeated below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4, 6-8, 15-19, 21-23, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,092,171 (Relph) in view of US 6,564,305 (Moore).

With respect to claims, 1 and 16, Relph teaches a device and method for managing real memory in a computer system having an operating system and a compressed main memory defining physical memory and a real memory characterized as an amount of main memory as been by a processor, and including a compressed memory hardware controller device for controlling processor access to said compressed main memory (system including a processing circuit which receives data from the host, a memory device which stores data and comprises a plurality of storage locations, and a memory management unit for controlling the storage of data in the memory device) [Abstract; Fig. 3A; Col. 2, Lines 54-63; Col 4, Lines 29-38], comprising: compressed memory device driver for receiving real memory usage information from said compressed memory hardware controller, said information including characterization of said real memory usage state (a compression program for effecting compressed storage of data in memory) [Col. 2, Lines 63-65; Col. 4, Lines 25-32]: compression

management subsystem for monitoring said memory usage and initiating memory allocation and memory recovery in accordance with said memory usage state, said subsystem including mechanism for adjusting usage threshold for controlling memory state changes (the memory management unit determining when the amount of data stored in one particular subset of the ordered array of subsets exceeds a predetermined threshold) [Col. 2, Lines 65-67; Col. 4, Lines 37-42; Col. 7, Lines 60-67]. Relph additionally teaches memory management unit determining whether the virtual address corresponds to a physical address without software assistance or additional information [Col. 10, Line 17-20]; but fails to specify that memory usage in said computer system is transparent to said operating system. However, Moore teaches compression management in a device wherein memory usage in said computer system is transparent to said operating system [abstract; Col. 1, Lines 46-50]. Therefore, it would have been obvious to one having ordinary skill in the art to come up with the claimed feature because, as taught by Moore, the implementation of compression at the application level would have increased the cost of application development and decreased stability of application execution.

With respect to claims 2 and 17, Relph teaches said controller hardware comprising in interrupt generator for generating interrupt indicating memory usage exceeding a physical memory usage threshold, said characterization of said real memory usage including a memory state set according to an amount of physical memory used (the compression management responding to the compression signal by generating a

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compression signal effecting compressed storage of data within the memory) [Col. 2, Line 65 to Col. 3, Line 3].

With respect to claims 3 and 18, Relph teaches said memory controller including one or more threshold registers associated with a physical memory usage threshold, said interrupt being generated when a usage threshold value is exceeded [Col. 8, Lines 48-67; Col. 5, Lines 29-38].

With respect to claims 4 and 19, Relph teaches said device driver comprising a mechanism responsive to said interrupt for adjusting said physical memory usage threshold value in accordance with a current memory usage state [Col. 8, Lines 48-67; Col. 5, Lines 29-38].

With respect to claim 6 and 21, Relph teaches said compressed memory device driver comprising a mechanism responsive to said interrupt for broadcasting low physical memory interrupts to client applications running on said computer system [Col. 8, Lines 48-67].

With respect to claims 15 and 28, Relph teaches managing said real memory usage including memory usage information including memory compression statistics [Col. 8, Lines 48-67].

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With respect to claims 7-8 and 22-23, Relph teaches a memory threshold state including one of a steady state warning state and emergency state, said memory threshold programmable by a user, and said device driver including in interface for enabling the user to set a memory usage threshold [Col. 6, Lines 13-34; Col. 8, Lines 48-67].

Allowable Subject Matter

5. Claims 5, 9-14, 20, 24-27, and 29-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6516,397 (Roy et al) teaching virtual memory system utilizing data compression implemented through a device.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pierre-Michel Bataille whose telephone number is (703)

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305-0134. The examiner can normally be reached on Tue-Fri (7:30A to 6:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew M. Kim can be reached on (703) 305-3821. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Pierre-Michel Bataille
Primary Examiner
Art Unit 2186

September 1, 2004